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Kegel exercises to improve bladder function in patient with type 2 diabetes and urinary incontinence

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Abstract
According to data from the World Health Organization (WHO), around 200 million people worldwide experience urinary incontinence. Patients with diabetes mellitus often exhibit characteristics such as polyuria, caused by elevated blood glucose levels that exceed the kidney's ability to absorb glucose. This results in osmotic diuresis, where excess glucose pulls fluids and electrolytes, leading to frequent urination. Urinary incontinence is best initially managed with non-pharmacological approaches, such as Kegel exercises. This study aims to assess the effectiveness of Kegel exercises in improving bladder function for diabetes mellitus patients with urinary incontinence. The patient reported difficulty holding urine, especially while coughing or laughing, and had a history of diabetes mellitus. The frequency of urination was initially 10 times per day. On the first day of the study, the patient's urination frequency remained high. By the second day, the frequency decreased to 9 times per day. By the final day, the patient was urinating 9 times daily, and episodes of urine leakage during coughing, laughing, or standing had significantly reduced. These findings suggest that Kegel exercises, when performed consistently, can effectively manage urinary incontinence in diabetic patients.

Keywords: Kegel exercise; diabetes care; urinary incontinence; adult nursing; hospital care

Introduction
Nerve damage can prevent individuals from effectively controlling the contraction of the detrusor muscle in the urinary system, often leading to urinary incontinence (O'Connor, Nic An Riogh, Karavitakis, Monagas, & Nambiar, 2021). This condition can be further complicated by other issues, such as limited mobility or cognitive impairment. Patients may experience a sudden, urgent need to urinate, often without enough time to reach the toilet, resulting in incontinence; similar incidents can also occur during sleep (Demaagd & Davenport, 2012). The primary classifications of incontinence include: Stress Incontinence often caused by a weakened urinary closure mechanism. Typical symptoms include urine leakage during actions like coughing, sneezing, climbing stairs, standing up after sitting or lying down, or making sudden movements. Urge incontinence, an involuntary loss of urine due to a strong, sudden urge to urinate (Biswas et al., 2017). Overflow incontinence occurs when the bladder is overly distended, causing the pressure within the bladder to exceed the maximum urethral pressure without detrusor muscle activity, leading to involuntary leakage. Urinary fistulas often related to childbirth or operative procedures (e.g., caesarean sections, perforations, forceps extractions), urinary fistulas can result in continuous leakage of urine.

Clinical manifestations of urinary incontinence include various types and symptoms. Stress incontinence involves urine leakage during actions such as coughing, sneezing, or physical strain. Urge incontinence is characterized by an inability to hold urine, often resulting in frequent and urgent trips to the bathroom. Nocturnal enuresis, or bedwetting during sleep, affects about 10% of children aged 5 and 5% of children aged 10; this issue in older children may indicate an underlying instability in urinary function (Aoki et al., 2017). Other symptoms associated with urinary incontinence include discomfort in the pubic area, bladder distension, frequent urination with a minimal volume of urine (20-50 ml), an imbalance between fluid intake and urinary output, an inability to sense urine flow, and a persistent feeling of fullness in the bladder even after urination (Mohamed-Ahmed, Taithongchai, da Silva, Robinson, & Cardozo, 2023). Preventive measures for urinary incontinence focus on minimizing risk factors. These include avoiding potential causes of incontinence, quitting smoking and avoiding exposure to secondhand smoke, consuming a high-fiber diet to prevent constipation, and limiting intake of alcohol, caffeine, and carbonated beverages. Staying active with regular physical exercise, controlling body weight to prevent obesity, and avoiding the habit of holding in urine are also recommended strategies for preventing urinary incontinence (Nightingale, 2020). Urinary incontinence can be managed with a range of treatment methods.

Non-pharmacological therapies include supportive measures such as patient education, making environmental adjustments to enhance accessibility, and using protective clothing or pads to manage symptoms. Behavioral interventions are also effective, particularly pelvic floor muscle exercises like Kegel exercises, which

strengthen the muscles controlling urination (Abu Raddaha & Nasr, 2022). Other behavioral approaches include bladder training and scheduling urination at regular intervals to improve bladder control. Additional treatments for urinary incontinence may involve medical therapy, surgical procedures, and catheterization, depending on the severity and underlying causes of the condition. The author chose this topic because urinary incontinence remains common in hospital settings, and many patients feel embarrassed to seek treatment, believing that it is incurable. A study indicates that early Kegel exercises can stimulate pelvic floor muscles and help prevent urinary incontinence symptoms before they appear (Cho & Kim, 2021). Developed by Arnold Kegel, these exercises have shown an 84% improvement rate in men and women with various forms of urinary incontinence. Based on this evidence, the author decided to implement Kegel exercises as a therapeutic approach for the managed patients in this study.

Case Description

Mr. T, a 72-year-old male Muslim, reported experiencing frequent bedwetting and an inability to hold his urine for several months. However, he had been reluctant to seek treatment. He described his urine as coming out in small amounts, often when he coughed, stood up, or laughed. He also mentioned a history of holding his urine frequently, along with a diagnosis of diabetes mellitus (DM) three years ago and hypertension two years ago. Mr. T shared that he had reduced his fluid intake, but his symptoms persisted, including pain during urination. He had not visited a health facility or taken regular medication, believing his condition would improve on its own. As a result, his diabetes was uncontrolled and untreated. According to his family, Mr. T used the bathroom approximately 10 times a day with assistance, often urinating in small amounts, and his urine appeared cloudy yellow with a characteristic smell. He described a lack of relief after urination, struggled to sleep at night, and frequently napped during the day. He needed help to sit up or go to the bathroom due to difficulty walking. Upon assessment, his vital signs were as follows: blood pressure 154/76 mmHg, pulse 87 beats per minute, respiration 20 breaths per minute, temperature 36.3°C, and blood glucose 437 mg/dL. He weighed 50 kg and was 163 cm tall. Following a nursing assessment, two priority nursing diagnoses were identified. The first was stress incontinence related to pelvic muscle weakness, as evidenced by complaints of urinary leakage (less than 50 ml) when abdominal pressure increased, incomplete emptying, and frequent urination. The second diagnosis was knowledge deficit about urinary incontinence, due to a lack of information, as shown by the patient's questions about his condition, behaviors inconsistent with recommendations, and misconceptions about his problem.

For stress incontinence, the primary intervention was pelvic floor muscle exercises, or Kegel exercises, to be conducted over three days with monitoring of urine output. The patient was instructed in performing Kegel exercises gradually, with an exercise evaluation and a recommendation to continue for 6-12 weeks. For the knowledge deficit, the intervention involved educating Mr. T on urinary incontinence, using visual aids and materials explaining incontinence, its causes, contributing factors, pathophysiology, symptoms, and management strategies. The nursing interventions took place over three days, from Sunday, June 2, 2024, to Tuesday, June 4, 2024. On the first day, the nurse introduced herself and established therapeutic communication with Mr. T. She explained the objectives, assessed the patient’s situation, and introduced urinary incontinence and Kegel exercises. Mr. T admitted he had never heard of Kegel exercises before. The nurse demonstrated the exercises, allowing him to attempt them, and provided education on urinary incontinence. On the second day, Mr. T reviewed the Kegel exercises he had learned. He still experienced some difficulty and had not yet memorized them. The nurse provided another demonstration, and he practiced again. His urination frequency reduced slightly, though not significantly. The nurse also reviewed the education provided on the first day, and Mr. T began to show a better understanding.

On the third day, Mr. T could perform Kegel exercises independently, and he could correctly answer questions about urinary incontinence. Day 1: Mr. T was still confused about Kegel exercises. He urinated 10 times daily, with leakage during coughing, sneezing, standing, and laughing. His vital signs remained similar to his initial assessment. He had difficulty grasping the incontinence information, and his responses to questions were uncertain. Day 2: Mr. T demonstrated an improved understanding of Kegel exercises and could perform them independently, though he still required guidance. His urination frequency decreased to 9 times per day. His blood pressure had decreased to 142/82 mmHg, and his blood sugar was 452 mg/dL. He answered more questions correctly but had yet to fully apply the knowledge in daily life. Day 3: Mr. T could perform Kegel exercises independently and maintain his urinary frequency at 9 times per day. His blood pressure was 155/72 mmHg, and his blood sugar had improved to 357 mg/dL. He could correctly answer all questions and applied what he had learned by managing his drinking habits and following a diabetes-friendly diet. The interventions helped Mr. T gain control over his symptoms and empowered him with the knowledge to manage his condition effectively in daily life.

Discussion

In clients with urinary incontinence, multiple nursing problems are identified, primarily stress incontinence and knowledge deficits. The author also found other potential issues, such as a risk of fluid and electrolyte imbalances and self-care deficits. However, after prioritizing these issues, only two nursing problems were selected: stress incontinence and knowledge deficits. The risk of fluid and electrolyte imbalance was deemed less immediate, and self-

care deficits could be incorporated within the knowledge deficit problem. Among non-pharmacological treatments, Kegel exercises are particularly effective for managing urinary incontinence. Arnold Kegel's research demonstrated an improvement rate of 84% in women with various types of incontinence (Burgio, Robinson, & Engel, 1986). These exercises target pelvic muscles, which, like other muscles, can weaken with age. Strengthening the pelvic muscles around the urinary tract helps improve control over urine flow. Kegel exercises involve contracting the pelvic muscles as one would when holding in gas (Sheng, Carpenter, Ashton-Miller, & Miller, 2022). Practiced multiple times daily for about 10 minutes per session, these exercises are easy to perform anywhere, ideally while lying down. After 4-6 weeks of consistent practice, improvement is expected, as urine leakage should decrease. In this managed case, Kegel exercises were introduced and practiced over three days. On the first day, the author introduced the exercises to the client, demonstrating them with the client's wife assisting. On the second day, the client practiced independently with guidance. By the third day, the client could recall and perform the exercises on his own. Daily evaluations were conducted to assess the effectiveness of the intervention. Day 1: The client expressed fatigue and unfamiliarity with the exercises, as he rarely engaged in physical activity. Urination frequency remained high. Day 2: The client's urination frequency decreased from 10 times daily to 9. He continued to show improvement in performing Kegel exercises independently. Day 3: The frequency remained at 9 times daily, and urine leakage during coughing, laughing, or standing showed some reduction.

These findings align with studiy which demonstrated that combining Kegel and bridging exercises significantly reduces urinary incontinence in elderly patients. This effectiveness stems from strong collaboration between patients and caregivers, allowing exercises to be performed optimally (Rodríguez-Longobardo, Guadalupe-Grau, Gómez-Ruano, & López-Torres, 2023). Further research emphasizes the importance of pelvic muscle exercises for strengthening the bladder's detrusor muscle, which can lose elasticity with age, causing incontinence (Aydin Avci & Öz Yildirim, 2023). Behavioral interventions like Kegel exercises are most effective when combined with routine blood sugar monitoring, especially in clients with diabetes, which can aggravate urinary incontinence (Cross et al., 2023). To manage diabetes, clients should follow a controlled diet, engage in regular exercise, receive health education, monitor lifestyle factors, practice foot care, and consider pharmacological treatments, including insulin and oral hypoglycemics. Despite three days of Kegel exercises, the client's results were not optimal; minor urine leakage persisted. Consistent exercise over 4-6 weeks is required to achieve full benefits, which showed significant improvements in urinary incontinence with three weeks of continuous Kegel exercise. These exercises can significantly strengthen the pelvic floor muscles, thereby improving the bladder's external sphincter function. However, Kegel exercises may not be suitable for elderly clients with difficulty controlling elimination or those with weakened extremities due to conditions like fractures or strokes, as certain movements could cause additional strain. Ultimately, overcoming nursing problems like stress incontinence depends on the client's commitment to performing Kegel exercises regularly for a minimum of six weeks. Active participation in self-care, such as performing pelvic floor exercises, is essential for improvement. Addressing knowledge deficits also involves seeking reliable health information and checking in at local health facilities when necessary to prevent worsening of the condition. From the results of nursing care provided, the author recommends Kegel exercises for managing urinary incontinence. These exercises are safe, simple to teach, and effective for elderly clients, requiring minimal time and yielding long-term benefits.

Nurses play a crucial role in guiding patients with diabetes and urinary incontinence through Kegel exercises, providing both instructional and holistic support (National Collaborating Centre for Women's and Children's Health (UK), 2013). They educate patients on the proper technique for Kegel exercises, helping them identify and contract pelvic floor muscles effectively, which is essential for symptom management. By monitoring and assessing progress, nurses can evaluate the effectiveness of these exercises, adjusting the regimen as needed and ensuring that the exercises are performed correctly. Nurses also support patients in incorporating Kegel exercises into their daily routines, encouraging consistency and addressing any challenges patients may face, such as discomfort or difficulty remembering to practice (Sharma & Chakrabarti, 2018). Beyond exercise instruction, nurses provide essential lifestyle counseling. For diabetic patients, this includes guidance on fluid intake, dietary adjustments, and blood sugar management, as high glucose levels can exacerbate urinary frequency. Nurses help patients understand how controlling blood sugar and avoiding bladder irritants like caffeine can improve incontinence symptoms. Additionally, nurses offer emotional support, addressing the psychosocial impact of incontinence, which often includes embarrassment or social isolation, especially for older adults (Harland et al., 2023). Creating a non-judgmental environment encourage patients to discuss their symptoms openly, which can lead to better adherence to treatment plans. Nurses also collaborate with other healthcare providers, such as endocrinologists and physical therapists, to ensure a well-rounded approach to the patient's care. If patients encounter barriers to performing Kegel exercises due to physical limitations, nurses may coordinate with specialists to explore alternative therapies or modifications. Educating family members and caregivers is another important aspect of nursing care, as they often play a supportive role in reminding and assisting patients with exercises and monitoring symptoms (McKinney, Keyser, Pulliam, & Ferzandi, 2022). Through this comprehensive, patient-centered approach, nurses empower patients to better manage their urinary incontinence, improve their quality of life, and support diabetes management effectively.

Conclusion

Kegel exercises offer an effective, non-invasive approach to improving bladder function in patients with type 2 diabetes and urinary incontinence. Regular pelvic floor muscle training helps strengthen the muscles that control urine flow, reducing instances of leakage and urgency commonly associated with diabetes-related incontinence. For patients with type 2 diabetes, maintaining strong pelvic floor muscles is especially beneficial, as diabetes can lead to nerve and muscle weakness that affects bladder control. Consistent practice of Kegel exercises, ideally over a period of 4-6 weeks, has been shown to enhance muscle tone, improve bladder stability, and contribute to better overall urinary control. However, patient education, encouragement, and support from healthcare providers, particularly nurses, are essential to ensure proper technique and adherence to a regular exercise routine. Nurses play a key role in teaching the exercises, providing lifestyle guidance, and helping patients integrate Kegel exercises into daily life. With ongoing practice and support, Kegel exercises can empower patients to manage their incontinence, enhance their quality of life, and promote independence. This approach also highlights the importance of a holistic and proactive approach to diabetic care, addressing both metabolic health and quality of life.

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